



Installation Instructions

FLEX Ex 85-253V AC In/Quad-Ex DC Out Power Supply

(Cat. No. 1797-PS1E)

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. *Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls* (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at <http://www.ab.com/manuals/gi>) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.





Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc. is prohibited.

Throughout this manual we use notes to make you aware of safety considerations.

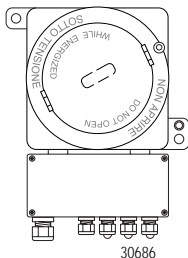
Allen-Bradley

2 FLEX Ex 85-253V AC In/Quad-Ex DC Out Power Supply

Important User Information

WARNING 	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.
ATTENTION 	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you: <ul style="list-style-type: none">• identify a hazard• avoid a hazard• recognize the consequence
SHOCK HAZARD 	Labels may be located on or inside the drive to alert people that dangerous voltage may be present.
BURN HAZARD 	Labels may be located on or inside the drive to alert people that surfaces may be dangerous temperatures.

1797-PS1E



ATTENTION

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as "enclosed" equipment. It should not require additional system enclosure when used in locations consistent with the enclosure type ratings stated in the Specifications section of this publication. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings, beyond what this product provides, that are required to comply with certain product safety certifications.

About the Power Supply

The power supply is an essential component in the operation of an intrinsically safe system. It must isolate the unsafe incoming power from the control system and limit the available energy to IS-safe levels.

No other power source is needed to operate any components attached to the FLEX Ex™ system in the hazardous area. Power for valves, actuators, or transmitters come from the FLEX Ex modules.

- The 1797-PS1E is a 85-253V ac in/quad-Ex dc out power supply in a flame-proof enclosure with increased safety input/output terminations. The 85-253V ac glan is an M20 x 1,5 and can accept a cable from 6mm to 12mm in diameter. The Ex outputs are M16 x 1,5 and can accept a cable from 4mm to 8mm in diameter.

Features include:

- 85-253V ac supply source
- four channels, 8.5W output each channel
- outputs are IS galvanically isolated from the source
- all channels are independently IS limited

Understand System Planning

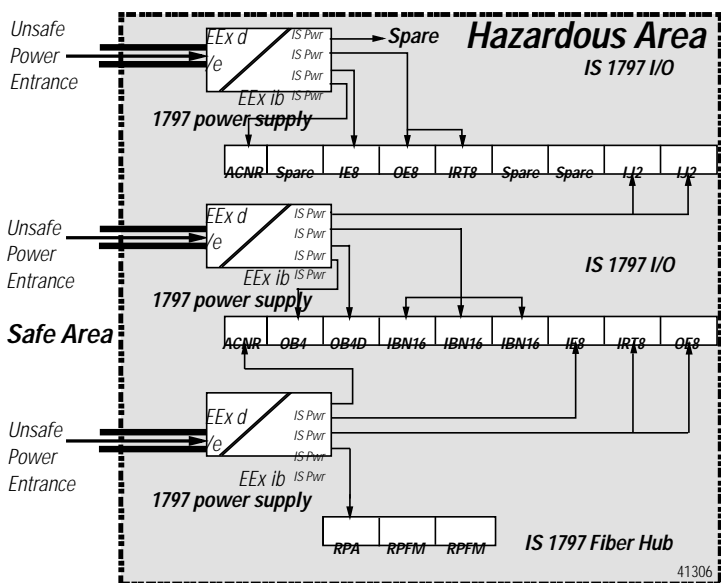
Part of system planning is determining what modules are needed for the application, how many power supplies are needed, how to best partition the system, and where to locate the system cabinets.

A key task in the development cycle is determining the number of power supply outputs (thus power supplies) you will need. In the following example, you will need eleven power outputs if you are using the fiber hub, which requires 8.5W:

Modules	Requires	Modules	Requires
Fiber Hub	8.5W	Two Thermocouple Inputs	1.6W each
Two ControlNet™ Adapters	8.5W each	Two Digital Outputs	7.5W each
Two Analog Inputs	7.5W each	Three NAMUR Digital Inputs	2.8W each
Two Analog Outputs	6.3W each	Two Counter Inputs	4.25W each

Each power supply has four independent IS power outputs capable of 8.5W each. In the above example, we required eleven IS power outputs so three power supplies were sufficient.

The total number of power supplies needed depends on the modules used and the total system configuration. The following illustration shows how this example may be configured.

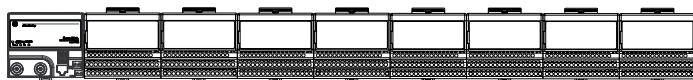
**IMPORTANT**

Even though modules may be supplied with power from the same power supply output channel, galvanic isolation in the module provides module to module galvanic isolation. Depending upon the module-type, galvanic isolation (channel-to-channel within the module) may or may not be provided. See the module's specifications for more information.

Allen-Bradley

6 FLEX Ex 85-253V AC In/Quad-Ex DC Out Power Supply

Make certain that you only connect intrinsically safe power supplies to other intrinsically safe system modules or adapters to maintain the integrity of the intrinsically safe backplane.



41307

Installation in Zone 1, 22

The 1797-PS1E power supply has a protection factor of IP65. Refer to the specifications table for the IS module type.

ATTENTION

The power supply cannot be used in an intrinsically safe environment after its outputs have been exposed to non-intrinsically safe signals.

Application

When installing, commissioning, operating and maintaining devices or device components of the Flex Ex system as intrinsically safe electrical apparatus in potentially explosive atmospheres according to EN 50020, you must heed the EC- type examination certificate and the applicable national and local construction, installation and operating regulations.

Zone 1

The Power Supply unit can be located in Zone 1. The permissible ambient temperature of -20°C to $+70^{\circ}\text{C}$ must not be exceeded.

Zone 22

The housing type of the power supply is applicable for the use in Zone 22. It corresponds with the category 3D acc. to directive 94/9 EC and is marked with a type label accordingly.

Commissioning, Installation

The Power Supply unit can be located in Zones 1, 2 and 22 as stated on its label. The output circuits are according to the ignition protection class EEx ib and can be installed in Zones 1, 2 and 22. When installing, you must heed the EC- type examination certificate (especially the special conditions) and the applicable national and local construction, installation and operating regulations.

The housing (EEx “d”) must not be opened (screw cover). Connections are made in the EEx “e” terminal box.

Install the Power feed lines only in the de-energized state. Also follow the information on the type label, respectively the covers of the terminals.

You can connect and disconnect the intrinsically safe output terminals during operation.

All unused cable glands must be covered by appropriate prototype tested EEx “e” lead seals to keep the requirement of IP54.

The cover installed on the non-intrinsically safe screw terminals (IP30) may only be removed in the de-energized state and must be re-mounted after working on these terminals.

Before closing the cover of the EEx “e” wiring box, inspect the seal for any signs of damage. In case of damage, the seal must be replaced by a new seal that is identical to the damaged seal.

The power supply housing contains two flanges, which can be connected to a wall or other structural part by means of fixing screws. Select fixing screws that ensure secure fixing of the power supply. Consider the condition of vibration of the power supply when making this selection.

On the EEx “d” housing there is an earthing screw. This screw must be connected to Earth with a conductor having a minimum of 4 mm² area. The connection has to be protected against self opening and corrosion. Corrosion protection can be achieved by using tinned terminal ends.

Before opening the EEx “e” terminal box (e.g. for maintenance purposes), it must be cleaned of all dust particles to ensure that no dust can enter the box.

Electrostatic Charge

ATTENTION



Preventing Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- If available, use a static-safe workstation.
- When not in use, store the equipment in appropriate static-safe packaging.

Protect the system against electrostatic charge. Post a sign near this module: **Attention! Avoid electrostatic charge.** For your convenience, a sign which can be cut out and posted is included on the last page of these installation instructions.

Outputs

When using an intrinsically safe electrical apparatus according to EN50020, the European directives and regulations must be followed.

The channels in the power supply are electrically connected to each other and have a common +V line.

IMPORTANT

You cannot interconnect lines because of the intrinsic safety requirements.

Mount the 1797-PS1E Power Supply

Follow these directions to properly install the 1797-PS1E power supply. Refer to the “Commissioning, Installation” section, page 7, for important precautions and considerations.

ATTENTION

Use star washers and nuts to make sure you have a good electrical connection. Scrape the paint off the back panel in those areas where grounding bolts will be located.

1. Remove the screws on the cover of the power supply EEx “e” terminal box to access the input and output terminals.
2. Thread the blue IS-safe output power wiring through the blue IS compression seals.
3. Connect the blue IS-safe output power wiring to the output terminals making sure all connections are tight.

These power supply outputs provide the input power to the FLEX Ex modules.

4. Thread the hazardous incoming power wiring through the black compression seals.
5. Connect the hazardous incoming power wiring to the input terminals making sure all connections are tight.

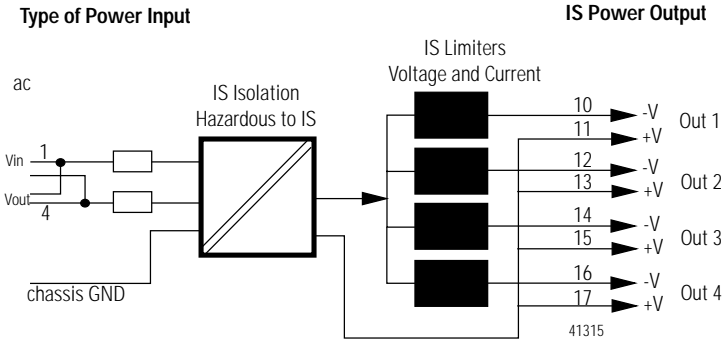
You can daisy chain the hazardous incoming power wiring to further supplies to simplify system wiring.

ATTENTION

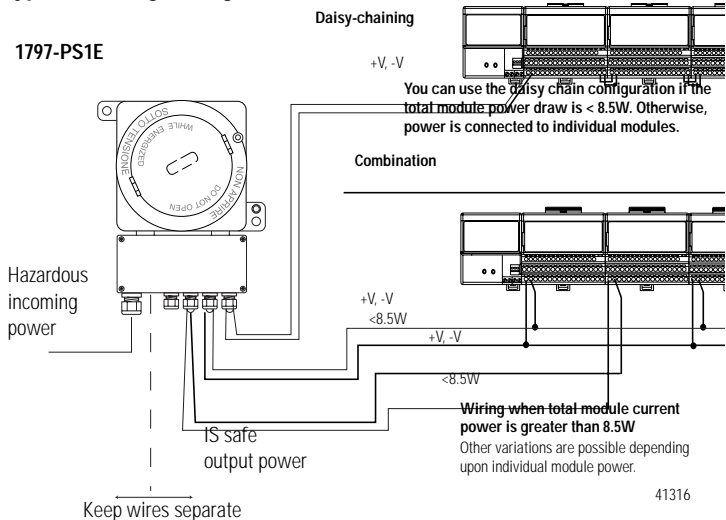
Keep hazardous and IS-safe wiring separated in a suitable fashion. Do not leave long, excess wiring that could bridge between the hazardous and safe areas.

6. Replace the lid of the EEx “e” terminal box.
7. Screw the lid back into place making sure all of the screws are tight.

Customer Connections

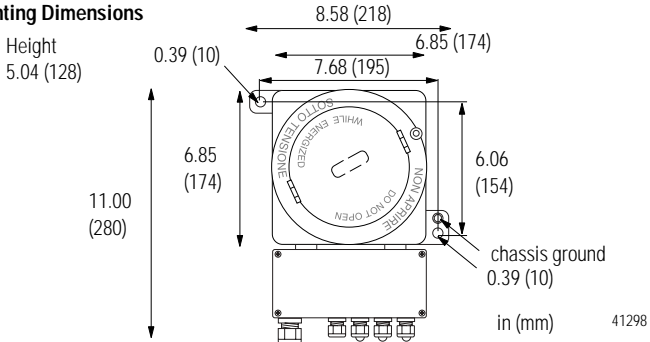


Typical Wiring Configurations



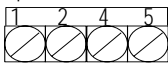
1797-PS1E Mounting Dimensions and Terminal Base Assignments

Mounting Dimensions



Terminal Base Assignments

European AC Power Input

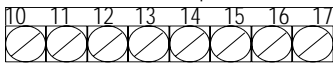


cha
GND

Vin

Vout

IS Power Output



+V -V +V -V +V -V +V -V

Out 1

Out 2

Out 3

Out 4

42489

Repair

The power supply is not field-repairable. Any attempt to open this module will void the warranty and IS certification. If repair is necessary, return this module to the factory.

Specifications - 1797-PS1E

Zone 1	II 2G EEx de [ib] IIC T4 (DMT 02 ATEX E253 X)
Zone 22	II 3D IP54 T90C
Input Connectors	85-253V ac, Um = 253V ac Terminals 1, 2, 4, 5 (earth symbol)
Voltage Range	85-253V ac
Input Frequency	47-63Hz
Current Consumption	0.9A

12 FLEX Ex 85-253V AC In/Quad-Ex DC Out Power Supply

Specifications - 1797-PS1E (Continued)

Ripple	n/a
Input Power Entrance	Increased safety
Output Connectors	Terminals 10-17
Output Power	4x8.5W
Inset Voltage Range	85-253V ac
Voltage U_0	$\leq 9.5V$
Current I_0	$\leq 1A$
C_0 (IIC)	≤ 500 nF
L_0 (IIC)	≤ 8 μH
Maximum Output Cable Resistance (both directions)	$\leq 0.1\Omega$
Isolation Path	
Input Power to Output Power	Galvanic to DIN EN50020
Output to Output	None
Input Power	55W
Power Dissipation	21W
Thermal Dissipation	71.67 BTU/hr
Conductors Wire Size	12 gauge (4mm ²) stranded maximum 1.2mm (3/64in) insulation maximum Use wire rated for 100°C operation
Dimensions	174mm x 174mm x 280mm (6.9in x 6.9in x 11.0in)
Protections Class	IP 65/NEMA 7B
Weight (approximately)	7.7kg (17lbs)
Operating Temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20 to 70°C (-4 to 158°F)
Storage Temperature	IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat) -40 to 85°C (-40 to 185°F)
Relative Humidity	IEC 60068-2-30 (Test Db, Un-packaged Non-operating Damp Heat): 5 to 95% non-condensing

Specifications - 1797-PS1E (Continued)

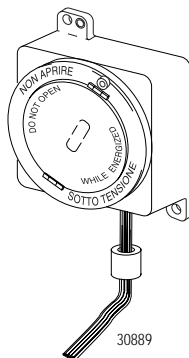
Shock	IEC60068-2-27 (Test Ea, Unpackaged shock): Operating 15g Non-operating 15g
Vibration	IEC60068-2-6 (Test Fc, Operating): 2g @ 10-500Hz per
Emissions	CISPR 11 Radiated, Class A Conducted, Class B
Certifications: (When product is marked)	<p>CE¹European Union 89/336/EEC EMC Directive, compliant with: EN 61000-6-4; Industrial Emissions EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 50082-2; Industrial Immunity European Union 73/23/EEC LVD Directive, compliant with: EN 50178; Electronic Equipment for use in Power Installations</p> <p>EEx¹European Union 94/9/EC ATEX Directive, compliant with: EN 50014; Potentially Explosive Atmospheres, General Requirements EN 50018; Potentially Explosive Atmospheres, Protection "d" EN 50019; Potentially Explosive Atmospheres, Protection "e" EN 50020; Potentially Explosive Atmospheres, Protection "i" EN 50281-1-1; Electrical apparatus protected by enclosure</p> <p>C-Tick¹Australian Radiocommunications Act, compliant with: AS/NZS CISPR11; Industrial Emissions</p>

1. See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Allen-Bradley

Ferrite Beads

Pass all IS power supply output wires through the ferrite bead before connecting the cable to the power supply.



Attention: Avoid electrostatic charge.

FLEX Ex is a trademark of Rockwell Automation.
ControlNet is a trademark of ControlNet International.

Notes:

Allen-Bradley

Rockwell Automation Support

Rockwell Automation provides technical information on the web to assist you in using our products. At <http://support.rockwellautomation.com>, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect Support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://support.rockwellautomation.com>.

Installation Assistance

If you experience a problem with a hardware module within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your module up and running:

United States	1.440.646.3223 Monday – Friday, 8am – 5pm EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

Rockwell tests all of our products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned:

United States	Contact your distributor. You must provide a Customer Support case number (see phone number above to obtain one) to your distributor in order to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for return procedure.

www.rockwellautomation.com

Corporate Headquarters

Rockwell Automation, 777 East Wisconsin Avenue, Suite 1400, Milwaukee, WI, 53202-5302 USA, Tel: (1) 414.212.5200, Fax: (1) 414.212.5201

Headquarters for Allen-Bradley Products, Rockwell Software Products and Global Manufacturing Solutions

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe: Rockwell Automation SA/NV, Vorstlaan/Boulevard du Souverain 36-BP 3A/B, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

Headquarters for Dodge and Reliance Electric Products

Americas: Rockwell Automation, 6040 Ponders Court, Greenville, SC 29615-4617 USA, Tel: (1) 864.297.4800, Fax: (1) 864.281.2433
Europe: Rockwell Automation, Brühlstraße 22, D-74834 Elztal-Dallau, Germany, Tel: (49) 6261 9410, Fax: (49) 6261 17741
Asia Pacific: Rockwell Automation, 55 Newton Road, #11-01/02 Revenue House, Singapore 307987, Tel: (65) 351 6723, Fax: (65) 355 1733

Publication 1797-5.33 - December 2003

PN 957831-51

Supersedes Publication 1797-5.33 - March 2003

Copyright © 2003 Rockwell Automation, Inc. All rights reserved. Printed in the U.S.A.